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RATIONALES FOR COLLABORATION; IMPLICATIONS FOR THE IRISH ROAD FREIGHT INDUSTRY

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ABSTRACT

The European Union has made a commitment to promoting sustainable mobility through advanced transport logistics. One of the principal areas yet to be addressed is that of the potential barriers to advanced transport logistics and the attitudes of industry to this advancement.

This paper addresses some of these concerns and argues that competition for high-value contracts can be very tough, especially where the contracts are from large organisations that often prefer to develop a relationship with only one transport service provider.

The paper attempts to put the research into a theoretical framework of Resource-Advantage Theory. Empirical evidence is presented from key informant interviews, semi-structured interviews and a focus group on the motives for and challenges of forming collaborative ventures.

The paper argues that joining forces to form a road haulage consortium can allow small-to-medium operators compete against larger players by improving services to the customer through reduced delivery times and wider geographical coverage. Collaboration has potential benefits not only for freight transport service providers in terms of efficiency and utilisation, but also for the wider society through increased quality of life.

Key Words: Road Freight, Collaboration, Competition, Sustainable Logistics, Utilisation, Transport Logistics.

1. INTRODUCTION

As Ireland is a peripheral economy on the edge of Europe, that is also export driven (Indecon, 1999), the cost of transportation tends to be about double that of its European neighbours, when transport costs are considered in percentage terms of the buyer's product price (Forfas, 1995). The movement of goods is of critical importance to an economy, especially one which is dependent on international trade such as Ireland. The perception of the prominence of transportation costs is probably one of the lowest in the area of logistics and therefore their importance and significance are underestimated in many cases. It is speculated that the movement of raw materials or finished products is often "taken for granted" (Short, 1985). The Indecon (1999) report on the future strategy of the road haulage industry identified a lack of information about the industry. There has been little improvement in the extent of research in recent years, with only a handful of reports available on the industry over the past twenty years. The only exception to this appears to be the road freight activity survey, carried out by the Central Statistics Office (CSO) in accordance with EU regulations.

The use of JIT (Just-In-Time) has forced many organisations to look in more depth at their transport suppliers. Given Ireland's distribution of manufacturing and other organisations throughout the country, it would be extremely difficult for the economy to operate without road haulage and, in a sense, many firms are dependent upon its effectiveness and efficiency. This view is supported by Short (1985: 14) *"Good transport facilities can aid the development of areas of industries and can increase the scope of greater flexibility with regard to locational decisions and distribution systems. In a sense transport can almost be regarded as a factor of production, for without the ability to move materials into and out of factories production is impossible or pointless."*

Ireland's history with regard to road haulage is similar to that of its European counterparts (McKinnon, 1998); its past is based on regulation in order to develop stability within the industry. In the 1960s opinions in relation to regulation began to change, principally due to the relaxation of the regulatory framework in Great Britain (Short, 1985). The first liberalisation act in Ireland was introduced in 1971, principally reducing restrictions on the transportation of commodities; the second was introduced in 1978, which relaxed the restrictions on the size of the haulage fleet. A report by the Transport Consultative Commission led the Minister for Communications to liberalise the road haulage industry in 1984, subject to some qualitative controls.

With the removal of tariffs associated with regulation, the industry's emphasis is now on free competition. Many challenges exist for the Irish haulier, such as high inflation (which is perhaps starting to subside), underdeveloped infrastructure and a fragmented industry, with 80% of the hire-and-reward haulage businesses having three vehicles or less. However, when viewed on a total-vehicle-numbers basis the issue of fleet size appears less significant, as illustrated in figure 1.1¹: about 41% of the vehicles are in fleets of three or less.

¹ Calculations based on 2003 licensed hire and reward vehicles in southern Ireland.

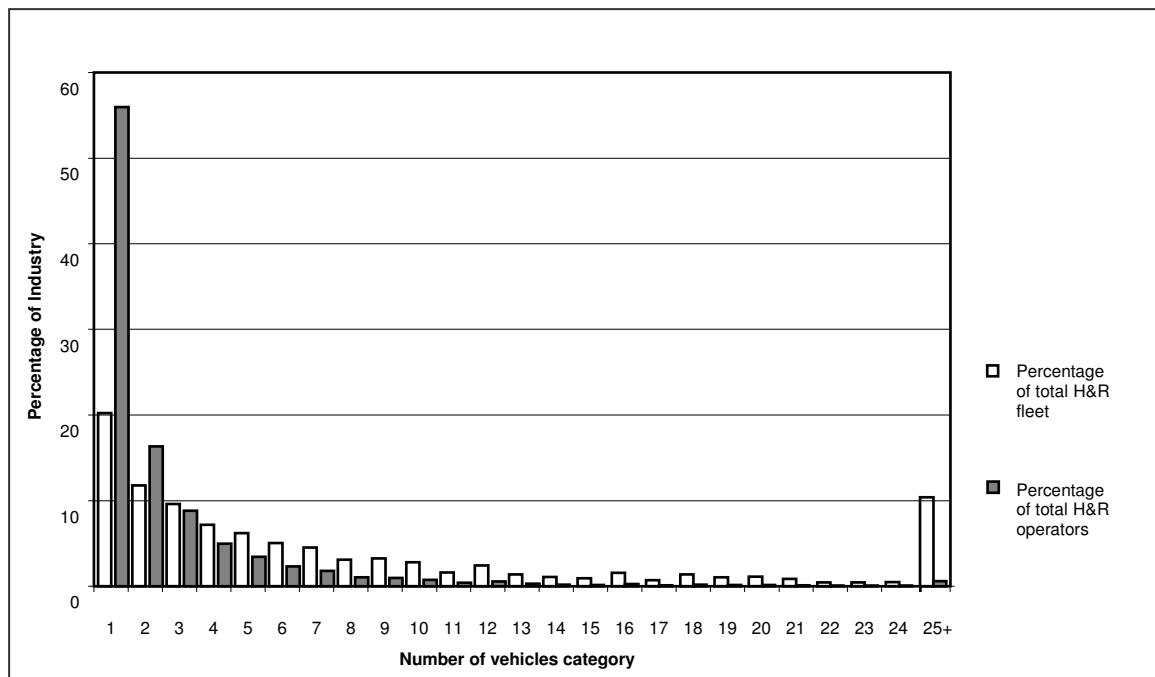


Figure 1.1 Industry breakdown: operators to vehicles

The Irish road haulage industry has experienced exceptionally strong growth over the past ten years due to its close correlation with economic growth patterns, as road transport accounts for 90% of freight transport activity in Ireland. An important influence on the size of firms appears to be demand. However, demand does not tend to lead to one optimum operator-fleet size due to the heterogeneity of the different sectors of the industry. The principal features of demand that affect size are its geographical distribution and volume levels (Kritz, 1973). Some key figures for the Irish industry are as follows (CSO, 2006):

- There was a 230% increase in tonne-kilometres over the ten-year period from 1995 to 2005;
- The fleet size increased by 163% from 1995 to 2005;
- Goods vehicles completed almost 24.5 million loaded journeys in 2005, 9% more than in 2004 and 163% more than in 1995;
- Vehicles that were used mainly for hire-and-reward transport of goods were responsible for 57% of the total weight of goods carried in 2005 and accounted for 32% of all relevant vehicles;
- Vehicles owned by transport businesses performed 47% of the total activity in terms of tonne-kilometres in 2005.

The operating environment of the Irish road haulage industry is characterised by a very competitive market, resulting in pressures on margins. This reflects demand and supply-side factors. On the demand side: time and timeliness have become a critical issue in the management of organisations and this places ever increasing demands on hauliers for flexibility, improved response times and high service levels. Increased product ranges and

product differentiation are leading to smaller shipments and higher frequency of deliveries. On the supply side: with deregulation there is relative ease of entry into the industry, underlying the competitive nature of the market (OECD, 2001).

As the Irish road haulage industry is fragmented in nature, what are the implications in relation to the EU and its ideological desires to increase sustainability, efficiency and effectiveness of logistics? Are these goals incompatible with a fragmented industry such as Ireland's?

2. LITERATURE

2.1. Firm Decision Theory

The “theory of the firm” states that the objective of the firm is to maximise profit and this is achieved by the firm choosing the least costly way to achieve a certain output. However, there is the assumption that managers act in an economically rational manner, that their decisions are always made with the objective of maximising profit, and that they have absolute knowledge.

Bell (1984) demonstrated non-neo-classical decision making by UK hauliers. Companies appeared to be establishing with an undetermined promise of work; they were unaware of their vehicles' and services' profitability. Under pricing also occurred somewhat prematurely, and decisions on asset purchase and replacement tended to be made intuitively rather than on an economic basis.

Many authors also challenge the assumption of economic rationality, based on empirical evidence. Others believe that profit maximisation is a must in order to survive in a competitive environment. There is an impressive mass of evidence indicating that the decision process that takes place inside firms is a “far cry” from profit maximisation (Maxcy, 1968).

Many critics of profit maximisation can be classified into two groups. One is categorised by a rejection of the maximisation concept mainly based on empirical studies. The other is categorised by seeking to maximise some other goal. The neo-classical economic defenders argue that the theory is based on logic and is not proposed to be an explanation of organisational decisions making (Lipsey, 1978). However, organisational behaviour and decision making often appear to occupy the gap between the empirical studies and the neo-classical economic theory.

The Behavioural Theory of the Firm originated from the Carnegie School in the 1950s (Hosseini, 2003). Many authors felt that the neo-classical approach did not represent reality: individuals made decisions and so factors that affected these individuals also affected their decisions and hence the organisation.

2.2. Placing the Research into a Theoretical Framework

The theory of Resource-Advantage (R-A) appears to be well placed as an underlying theoretical framework for this study. It rejects many of the premises of neo-classical economics and takes a realist epistemological approach (Hunt, 1997a).

It is a theory of competitive firm behaviour with its foundations in Edith Penrose's Theory of the Growth of the Firm. To summarise, R-A *"is a process theory of competitive firm behaviour that stresses the importance of market segmentations and resources"* (Hunt, 1997a: 60).

The R-A theory appears to have highly predictive and explanatory abilities that have been attributed to its descriptively realistic approach, due to its underlying foundational premises in realism. A comparison of neo-classical and R-A's premises illustrates this.

The premises of Research-Advantage Theory (Hunt, 2003) are:

- Demand is heterogeneous across industries and within;
- Consumer information is imperfect and costly;
- Human motivation is constrained self-interest seeking;
- The firm's objective is superior financial performance;
- The firm's information is imperfect and costly;
- The firm's resources are financial, physical, legal, human, organisational, informational and relational (tangible and intangible);
- Resource characteristics are heterogeneous and imperfectly mobile;
- The role of the management is to recognise, understand, create, select, implement, and modify strategies;
- Competitive dynamics are disequilibrium provoking, with endogenous innovation.

In comparison, the premises of neo-classical perfect competition are: perfect and costless knowledge, maximisation of self-interest and profit, and resources being limited to land, labour and capital. It is clear that R-A Theory incorporates market realities that other theories ignore. Its focal point is on the efficient and effective use of resources, leading to a comparative advantage, in turn resulting in a competitive advantage, aiding the firm's goal of superior financial performance (Hunt, 1997b). It attributes a number of internal and external factors to maintaining a firm's competitiveness. Internally, a firm may fail to reinvest in a resource, eroding the value of its output to customers. Management may lack the understanding or be unable to recognise the source of their success. Failure by the firm to modify its resources contributing to efficiency and effectiveness in a changing environment can lead to a shortening of the length of time in maintaining its competitive advantage.

The external factors affecting the life span of a firm's competitive advantage are somewhat comparable to those considered by the methods of strategic management in analysing the external environment (political, economical, social and technological). Actions by the government through legislation may render the resource inefficient or ineffective. The life span of the resource advantage can be shortened by customers changing their preferences in a particular market segment. Competitors will attempt to neutralise the firm's competitive advantage through improved management, and increasing the efficiency and effectiveness of their resources. Intangible assets such as relationships are more difficult for competitors to copy and will likely extend the firm's competitive advantage in comparison to physical assets. Due to this, theory is increasingly recognising the value of soft resources. R-A theory

recognises that human action is an important factor in relation to economic actors, both as inhibitors or enhancers to desirable economic outcomes (Hunt, 1997a).

In accordance with R-A theory, firms learn through competing and feedback is driven from the effects on financial performance and this in turn drives organisational change. The dynamics of competition concentrates on proactive or reactive measures to competition, and how competing firms manage their resources. Reaction usually concentrates on imitating the resources of others. Using relationships (a soft, intangible resource approach) can maintain a firm's competitive advantage, as this is difficult to imitate.

Competing through networks has seen increased attention, as the synergies they create, when successfully implemented, are difficult to copy. Relationships are viewed by R-A theory as intangible and imperfectly mobile, that is, difficult to transfer from one firm to another, unlike physical resources. This is likely to lead to a longer life span of competitive advantage in comparison to physical resources. However networks can be difficult to implement, it relies on the behavioural assets and the culture of the firm. In order for it to succeed, it needs to be mutually beneficial to the parties involved and compliment the firm's existing competencies, while providing an increased value offering to the market (Hunt, 1997b).

2.3. Relating Theory to the Irish Haulage Industry

The European Union has made a commitment to promoting sustainable mobility through advanced transport logistics. The European Commission has prioritised logistics, in particular "advanced integrated solutions" as these can optimise transport and decouple mobility from its associated pollution and congestion. One of the principal areas yet to be addressed is that of the potential barriers to advancing transport logistics and the attitudes of industry to this advancement (Commission of the European Communities, 2006).

It is speculated that the majority of hire-and-reward operators in the Irish road haulage industry are owner-managed. Therefore this paper is proposing that their decisions are a mix of economic and personal factors. An understanding of their motives, the barriers they come up against and the challenges they perceive will aid future policy, sustainability and Irish economic competitiveness.

2.3.1. Within-Industry Collaboration

Competition for high value contracts can be very tough, especially when the contracts are from large organisations that have a preference for developing a relationship with only one transport service provider. Joining forces to form a road haulage consortium can allow small-to-medium operators obtain these higher value logistics contracts. Consortia in the UK have been successful with this strategy. The potential benefits of such initiatives warrant serious consideration, as they meet not only economic but also sustainability objectives of the EU. Rail freight in Ireland has seen a sharp decline and Irish Rail now carries only 2% of the total freight, the second lowest percentage in Europe (Douthwaite et al, 2006). Therefore, in order to move towards increased sustainability, policies have to be orientated in the direction of the road freight industry: for instance, policies should encourage increased vehicle utilisation through road freight consortiums.

The benefits of collaboration include the increased utilisation of assets. This can be achieved through two principal operations. The first is co-loading or consolidating loads; this involves combining less-than-truckload (LTL) freight to create full truckloads, increasing utilisation and reducing the number of trips. The second is continuous move routing; this involves the

creation of tours that reduce one-way movements and empty miles. It converts separate consignments into multi-stop trips to reduce costs (Schoemehl, 2004).

A case study entitled “Wisbech Roadways” (DfT, 2006) illustrated these benefits with comparisons to industry benchmarks. Vehicle fill of 85% was achieved versus a UK national average of 69%; empty running was at 16% versus a national average of 19%; and the average weight-based load factor was 82% in comparison to an industry average of 53%.

Not only does collaboration have financial benefits for the operators involved, but also to society as a whole. Sustainability and JIT appear to be at odds with each other. Increased frequency of delivery has the potential to cause problems with increased complexity of scheduling which may reduce opportunities for return loading, may diminish vehicle utilisation and therefore may increase the environmental impact. Supply Chain co-ordination such as collaboration and freight consolidation initiatives will aid sustainability, the upholding of load factors and the improvement of vehicle productivity. It appears to be a win-win situation for society and commerce (McKinnon, 1999).

2.3.2. Producer Collaboration and Consolidation

E-commerce also has implications for freight transport, particularly with its emphasis on deliveries in residential areas. Consolidation of these deliveries would be desirable for residents and would offer potential benefits to freight transport providers by improving vehicle load factors, increasing drop densities and reducing the number of vehicles. *“This would benefit the company (higher efficiency), the customer (lower delivery costs) as well as the other residents (less traffic).”* (Bestufs, 2003: 108). However, many difficulties surround collaborative approaches: problems of logistics, cost accounting and balancing distribution among the partners; nevertheless, some consortiums have shown that it can be done.

Research into the logistics of Irish food exports identified opportunities for producer collaboration for manufacturers in the same region (Henchion & O’Reilly, 1999). Competing retailers use similar structures, resulting in parallel networks with comparable characteristics and cost levels. These retailers could combine their distribution centre networks rather than operating in parallel. It can logically follow that the standardisation of distribution networks no longer provides competitive advantages and that the potential advantages of multi-retailer distribution centres warrant serious consideration (Stephenson, 1999).

3. METHODOLOGY

With human factors playing an important role in motivation, resources, management and competitive advantage; the behaviour, intentions and attitudes of key personnel are of significance in understanding the development of road freight collaborative networks. Individuals in the organisation are the decision makers; therefore it follows what influences their decisions are key to gaining understanding of organisational decisions.

The Theory of Planned Behaviour (TPB) has been used in previous studies to elicit attitudes, extract barriers and develop an understanding of significant influencers on behaviour (Ajzen, 1991). TPB has initially been applied to the field of health science, but more recently has entered the transport research domain, principally in the area of transport planning and public transport user choice.

TPB conceptualises behaviour through intentions. The concept states that beliefs are antecedents of attitudes and in turn attitudes are the antecedents of intentions. Prior to a statistical survey and the measurement of attitudes by the use of Oskamp's (1977) Semantic Differential (SD) technique, a list of relevant beliefs must be developed for inclusion in a structured questionnaire (modal of salient beliefs (Oppenheim, 2000)); therefore an initial qualitative approach was undertaken. Hence the research strategy is that of a "dominant-less dominant design" (Creswell, 1994: 177).

A limited amount of primary research was initially undertaken. Purposive sampling was used to identify key informants, as special knowledge was necessary. The method used was qualitatively-based in order to gain understanding of the complex issues. Hence an approach that obtained "deep" data was required. Semi-structured interviews were the next step, as they are the best technique for the collection of the data characteristics. They are easily adapted to unpredicted or foreseen issues and allow further investigation of any such issues.

Seven semi-structured interviews of owner-managers in hire-and-reward haulage firms were completed. Hauliers were identified from the hire-and-reward licence database and a commercial directory of road freight operators. An explanatory postal letter was used to make first contact, stressing the importance of the research and the respondent's participation. This was followed by phone calls to schedule the interviews and to verify that they were in fact in the correct category.

In the first phase, firms were interviewed from different sectors: national and international distribution, refrigerated fresh food distribution, agricultural foodstuffs and construction supplies distribution. They were predominantly small-to-medium haulage firms that were not involved in consortiums; however they did participate in small co-operative ventures. They had many years experience in the road freight industry, with one interviewee having thirty years experience, while another had approximately five years, with the majority of interviewees having approximately ten years experience as an owner-manager. Many of the interviewees also had previous experience as an employee in the road freight industry, prior to establishing their own firm.

The owner-managers had a wide-ranging age profile (this was not specifically measured) from approximately sixty-five to thirty-five. The highest level of education of the interviewees was second level, two of the interviewees had partially completed second level and the remaining five interviewees had fully completed second level education. However, family members who were university graduates were advising a number of owner-managers. It is worth noting that three of the interviewees did not directly hold the Certificate of Professional Competency (CPC). Two firms paid a small fee to a person outside the organisation who held a CPC in order to document them as the firm's transport manager, the other firm's CPC was held by a family member. The interviewees' businesses were located throughout the country, with a slight geographical bias to firms located in the east of the country. However, this can be partly accounted for by the higher population and customer density in the province of Leinster (east Ireland).

In the second phase of the qualitative research, members of two collaborative networks were interviewed. The first network was hierarchical in structure, and appointed regional operators as agents. A semi-structured interview was carried out with the development manager of the controlling company. The members of the second collaborative network took part in a focus group session, with all eight members of the network present. This interview, and the focus group concentrated on motives for forming and joining a network and on whether or not aspirations had materialised.

The recordings from the interviews and focus group were transcribed. Content analysis was then applied; in order to breakdown the responses into key themes.

4. FINDINGS

4.1. Empirical Findings

It was found that personal and economic factors had an influence on the decisions of owner-managers in relation to collaboration and the development of value-adding services. The ages of the owner-managers and their quality-of-life-desires appeared to influence their willingness to develop or join collaborative ventures. Some haulage operators had land associated with their business and showed a tendency towards seeking “ease of return” on their assets, that is, towards possibly selling the land to developers rather than developing it for warehousing, which might have been required to move into pallet or other collaborative networks.

Control, or lack of control, was a major consideration for those who were already in a collaborative network, with many expressing hesitation to develop the network into one core business. They wished to maintain their independence while operating through the network to facilitate their existing customers. The biggest motivator to have joined a collaborative network appeared to be a reactive measure, in order to compete on a geographical and delivery-time basis with larger operators. By far the majority of the operators interviewed expressed increased ability to compete as the most significant decision-guiding factor for them, with regard to collaborative networks. They also expressed the view that future developments in relation to collaboration would be dictated by following the customer’s needs.

The size of an operator did not appear to be a limiting factor in joining a collaborative network. The decision criteria for the network in assessing the viability of a potential new member were primarily based on reputation, quality of service, and the operator’s capability and capacity based on the forecasted volumes through their potentially assigned region. Service levels and trust were also key considerations and some operators had delayed or declined joining other networks at a previous stage due to this.

It is worth noting that some anecdotal evidence was obtained in relation to transport consolidation in the food production industry. It appeared that some firms were still unwilling to consolidate transport with potential competition in the same region, even when presented with a potential transport cost saving of, for example, €200,000 per annum.

4.2. Relating the Findings to R-A Theory

Social aspects of R-A theory were found to be present in the collaborative ventures of the Irish road haulage industry. Significant relationships were present within the industry and trust was also found to be an important component of developing collaborative networks. The development of collaborative networks was a reactive response to competition and corresponded to R-A concepts, that is, relationships can enhance competition and not result in collusion as postulated by neo-classical economics. Financial performance was the driving force of these developments, as it was the basis of the feedback-based learning process.

However, as the development of collaborative networks was a reactive rather than a proactive measure, it was aimed at matching the resources of large operators and third-party logistics

providers and hence enhancing their higher-valued service as perceived by customers. The formation of the network allowed the members to provide an efficient, effective and valued product to their customers. The use of a hub system not only allowed them to shorten delivery times but also to increase utilisation rates. The development of the relational resource (collaborative network) was intended to neutralise the competition's competitive advantage, through increasing the effective resources of the members.

The collaborative networks appeared to complement the member firms' core competencies, as many of them already had a reputation for providing a quality service. There were also mutual benefits for the members involved in both networks researched, such as increased financial performance and facilitation of growth.

However, trust may have been a potential future barrier for one of the networks. To relate to this, R-A theory refers to relationships being developed and not just selected at a particular point in time. Over time the network members have relinquished some control and further enhanced their relationships within the network. The issue of control appears to have a moderating effect on the level of integration within the network. It is speculated that further competitive threats would probably motivate a reactive response by the network members and facilitate increased levels of collaboration.

Partnership management was also a key factor, with regular face-to-face meetings with members to ensure mutual benefits were being achieved. Service level agreements and prior agreed disciplinary procedures for breach of these service levels also played an important role in the trust-based governance.

R-A theory's characterisation of resources as being imperfectly mobile is illustrated in this context, as it would be incredibly difficult to transfer the established relational resource of a network to a competitor.

5. FURTHER RESEARCH

The qualitative results presented in this paper are being used to develop a statistical research instrument, based on the Theory of Planned Behaviour (Ajzen, 1991) and Osgood's Semantic Differential technique (Oskamp, 1977), with the purpose of measuring operators' intentions and extracting information about barriers in relation to collaboration. Increased understanding of the decision process, motives and challenges will aid logistics development in the sector and should lead to increased vehicle utilisation and improved sustainability and economic competitiveness.

6. CONCLUSION

Collaboration has potential benefits not only for freight transport service providers in terms of efficiency and utilisation but also for wider society through increased quality of life. R-A Theory appears to be a relevant, appropriate and an explanatory framework for this research. The use of collaborative networks appears to go somewhat towards the EU's goals of increasing sustainability, efficiency, effectiveness and competitiveness of European logistics. However, collaboration will require significant change for many organisations. Human factors such as trust and control appear to be potential barriers; the motivation to overcome these barriers may rest with a competitive threat motivating a reactive response. However,

consortiums can succeed and overcome some difficulties with the realisation of substantial benefits.

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REFERENCES

- Ajzen, I. (1991) "The Theory of Planned Behavior", *Organizational Behavior and Human Decision Processes*, Vol 50 No 2, pp. 179-211.
- Bell, G., Bowen, P., Fawcett, P. (1984), *The Business of Transport*, MacDonald and Evans, Plymouth.
- BESTUFS Thematic Network, (2003), *Consolidated Best Practice Handbook*, Competitive and Sustainable Growth Programme, www.bestufs.net.
- Central Statistics Office, (2006), *Road Freight Transport Survey 2005*, Government Publications Office, Dublin.
- Commission of the European Communities, (2006), *Freight Transport Logistics in Europe – the key to sustainable mobility*, COM(2006) 336 final, Brussels.
- Creswell, J. W. (1994), *Research Design: qualitative and quantitative approaches*, Sage Publications, London.
- Department for Transport, (2006), *Freight Best Practice: Profit Through Partnership*, Sept., HMSO, London.
- Douthwaite, R., Healy D. and Leyden, K. (2006), *Towards a Sustainable Transport System*, Comhar briefing paper 1, Dublin.
- Forfas Transport and Logistics Group, (1995), *World Class to Serve the World*, Government Publication Office, Dublin.
- Henchion, M. and O'Reilly, P. (1999) "Optimising logistics for Irish food exporters", *Logistics Solutions*, Issue 5.
- Hosseini, H. (2003) "The Arrival of Behavioral Economics: from Michigan, or the Carnegie School in the 1950s and the early 1960s?", *Journal of Socio-Economics*, Vol 32 No 4, pp 391-409.
- Hunt, S. (2003) "Resource-Advantage Theory and Embeddedness: Explaining R-A Theory's Explanatory Success", *Journal of Marketing Theory and Practice*, Winter, pp. 1-17.
- Hunt, S. (1997a) "Resource-Advantage Theory: An Evolutionary Theory of Competitive Firm Behavior", *Journal of Economic Issues*, Vol 31 No 1, pp. 59-77.
- Hunt, S. (1997b) "Competing Through Relationships: Grounding Relationship Marketing in Resource-Advantage Theory", *Journal of Marketing Management*, Vol 13, pp. 431-445.
- Indecon, Price Waterhouse Coopers, and NEA, (1999), *A Strategy for the successful Development of the Irish Road Haulage Industry*, Government Publication Office, Dublin.
- Kritz, L. (1973) "Optimum Structure and Size of Road Haulage Firms: positive and negative effects of specialization", *Report of the Twenty-Third Round Table on Transport Economics*, European Conference of Ministers of Transport, Paris.

- Lipsey, R. (1989), *An Introduction to Positive Economics*, Weidenfield and Nicholson, London.
- Maxcy, G. (1968) "Profit Maximization for Students and Management", *Yorkshire Bulletin of Economic and Social Research*, Vol 20 No 2, pp. 85-97.
- McKinnon, A. (1999), *Vehicle Utilisation and Energy Efficiency in the Food Supply Chain*, School of Management, Heriot-Watt University, UK.
- McKinnon, A. (1998) "The Abolition of Quantitative Controls on Road Freight Transport: the end of an era?", *Transport Logistics*, Vol 1 No 3, pp. 211-223.
- OECD, (2001), *Competition Issues in Road Freight*, DAF/CLP(2001)10, Paris.
- Oppenheim, A. N. (2000), *Questionnaire Design, Interviewing and Attitude Measurement*, Continuum, London.
- Oskamp, S. (1977), *Attitudes and Opinions*, Prentice-Hall, New Jersey.
- Schoemehl, D. (2004) "It's Capacity Crunch Time. Can Multi-Shipper Collaboration Help?", Dec. www.Inboundlogistics.com
- Short, J. (1985), *Aspects of Freight Transportation in Ireland*, ESRI Paper 124, Nov, Dublin.
- Stephens, C. (1999) "Beyond Competing Supply Chains - Can Retailers Pool Distribution Resources?", *Logistics Research Conference*, Newcastle Business School, Institute of Logistics, cited by Mason, R., Simons, D., Peckham, C. & Wakeman, T. (2002), *Life cycle modelling CO2 emissions for lettuce, apples and cherries*, Transport 2000, FSP & EAFL.